Understanding Relationships Between Changes in Ambient Ozone and Precursor Concentrations and Changes in VOC and NOx Emissions from 1990 to 2004 in Central California

Envair

DRI

Alpine Geophysics

November 18, 2005

Today's Meeting

- Provide overview
- Explore options
- Obtain input for work plan

Project Purpose

Improve current understanding of trends in emissions of ozone precursors, trends in ambient concentrations of ozone precursors, and trends in ozone levels in central California –

How are these trends related?

Overview of Tasks –
Most of Phase II Is Contingent on Phase I

Phase I

- Task 1: Work plan, data, & emissions assessment
- Task 2: Trends in ambient pollutants
- Task 3: Expected relationships, emissions & ambient
- Task 4: Phase I report and Phase II plan

Phase II

- Task 5: Emissions trends *(contingent)*
- Task 6: Relate ambient & emissions trends *(contingent)*
- Task 7: Final report and manuscript
- Task 8: Data, documentation, software
- Task 9: Project meetings

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Schedule –
(slightly revised from proposal)

- *Startup meeting – November 18, 2005*
- Phase I draft work plan – December 16, 2005
- *Task 1 meeting – early January 2006*
- Phase I final work plan – February 1, 2006
- Draft Phase I report & Phase II plan – May 1, 2006
- *Task 4 meeting – mid-May 2006*
- Final Phase I report & Phase II plan – June 30, 2006
- Draft final report & manuscript – October 2006
- *Task 7 meeting – November 2006*
- Final report & manuscript – December 31, 2006

Labor Hours –
Phase I = 694 hrs, Phase II = 1184 hrs

Labor Hours by Task
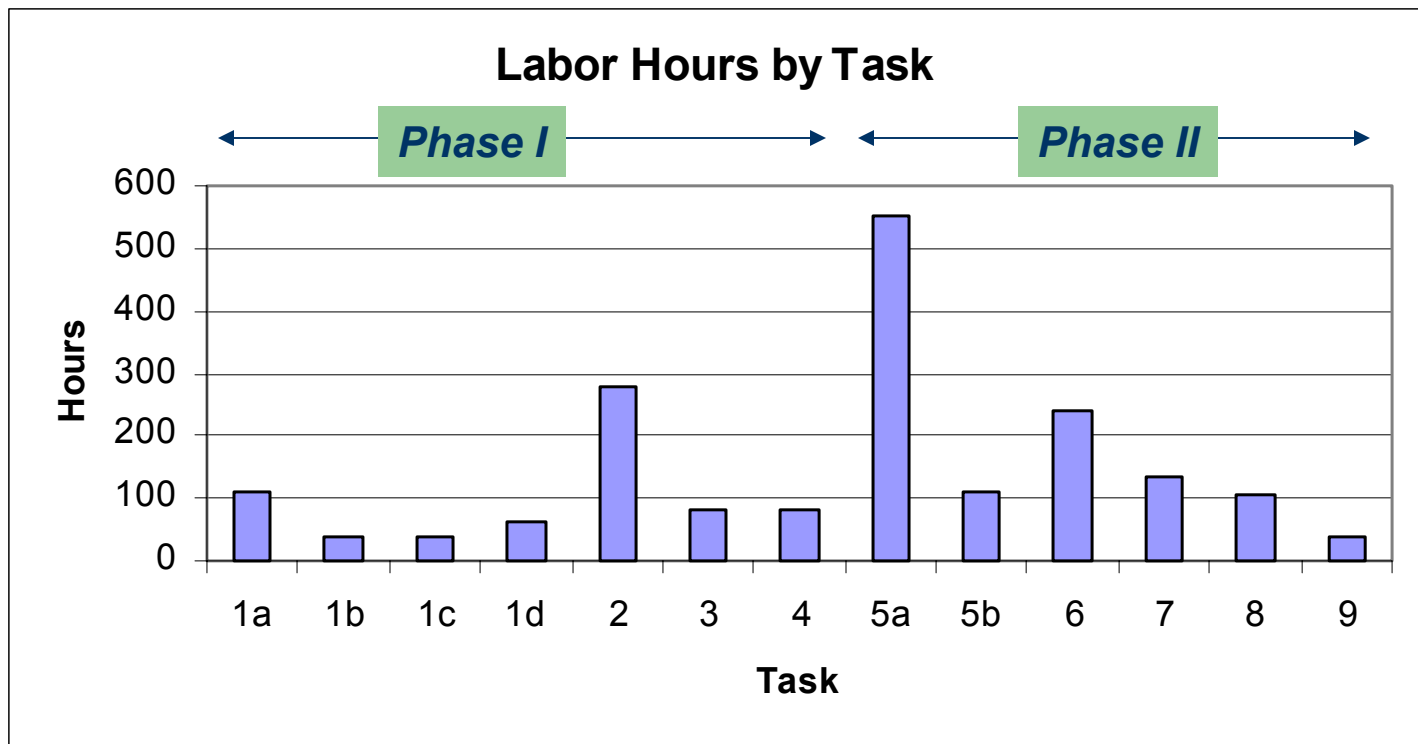
Task 1a – Review Emissions
(Alpine Geophysics, DRI)

- Review current understanding from top-down comparisons of emissions to ambient

- Collect historical estimates for point sources, pesticides, growth, area-source surrogates

- Distribute questionnaire

- Identify problem areas

Tasks 1b, c, d – Data and Work Plan
(Envair, DRI)

- Update AQ & met data bases
- Prepare work plan for Tasks 2, 3, 4
- Summarize issues

Task 2 – Ambient Trends
(Envair, DRI)

- Species and metrics
- Met classification and transport directions
- Trend tests

Ambient Trend Analysis (Task 2) – *Species and Metrics*

- Primary species plus ozone
- Ratios of CO/NOx and NMOC/NOx
- Link metrics for primaries to ozone metrics
- Ozone metrics *(possibilities)*
  - Top 30 peak 8-hour ozone days per year per site
  - One to two others
  - One regulatory metric? => 8 hour ozone DV

Ambient Trend Analysis (Task 2) – *Met Classification*

- Goal is to stratify days, not to adjust ozone
- Stratifications related to transport directions
- Possible choices of met classification method
  - (screening) surface/upper wind directions
  - DRI CCOS clustering algorithm
  - Clustering based on met variables related to wind directions and transport
  - CART
  - Trends in annual regressions of ozone against met variables

Ambient Trend Analysis (Task 2) – *Trend Tests*

- Simpler if possible

- Site specific

- Annual or monthly?

- Apply trends tests to each set of days (example – split top 30 into three types – determine annual averages of top 30 type A, top 30 type B, and top 30 type C – then determine trends for each type)

Task 3 – Expected Relationships for Emissions & Ambient Trends

A few key considerations:

- Presence or absence of statistically significant trends in ozone precursors
- Presence or absence of statistically significant trends in ozone
- Changes in VOC/NOx ratios
- Evidence for uncertainties in emissions based on available information

Task 4
Decision Point for Phase II

Task 5a - Historical Inventories *(Alpine Geophysics)*

- CCOS domain
- Incorporate Task 1 historical information
- EMFAC2002 to backcast county-level mobile
- Allocate to grid cells using gridded VMT
- Biogenic from BEIGIS with current land use
- Area sources – current or historical surrogates?
- Generate monthly gridded inventories for May – Oct of 1990-2004

Task 5 – Emission Trends
Task 6 – Ambient-Emissions Links

- Detailed approach to be delineated in Phase II work plan
- Develop monitor-specific emission trends
- GIS support as needed
- Separate emission trends by airflow category
- How do emission trends relate to ambient trends? For precursors? Ozone?

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Discussion, comments…?